

# Residential Refrigeration Program

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Work Group Discussion  
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## Outline

- Background
- Existing Regulations / Need for Program
- Emissions Inventory
- Potential Control Strategies
- Benefits & Costs
- Outstanding Questions
- Next Steps

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## Background

### Purpose of Residential Refrigeration Program

- Establishing a non-regulatory program to upgrade pre-2002, less energy efficient residential refrigeration equipment.
- Ensure proper recovery of refrigerants and foam blowing agents that have high global warming potential (high-GWP).
- Support appliance early retirement and related programs.

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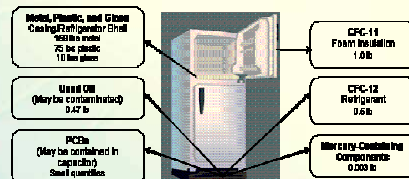
## Background (Continued)

### Current Programs:

U.S. Environmental Protection Agency - Responsible Appliance Disposal

#### – Focus on Commitment to Best Practices

- Refrigerant is reclaimed or destroyed.
- Foam or blowing agent is reclaimed or destroyed.
- Metals, plastic, and glass are recycled.
- PCBs, mercury, and used oil are recovered and properly disposed.



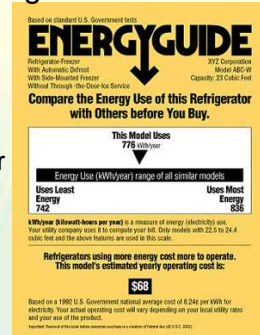
Copied from:  
<http://www.epa.gov/Ozone/title6/608/disposal/household.html>

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## Background (Continued)

### **Current Programs:**

- California Public Utilities Commission – Utility Sponsored Appliance Recycling Programs
  - Focus on Energy Efficiency to Remove Appliance from Power Grid
    - Refrigerant is reclaimed or destroyed.
    - Foam or blowing agent may be reclaimed or destroyed.
    - Metals, plastic, and glass are recycled.
    - PCBs, mercury, and used oil are recovered and properly disposed.



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## Existing Regulations

- **Existing Regulations**
  - Require the recovery of proper management of used oils, PCBs, mercury containing components, and refrigerants.
- **Need for Program:**
  - There are no laws or regulations governing the management of foam blowing agents.

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## Emissions Inventory / Banks

### Potential Magnitude of High-Global Warming Potential Greenhouse Gas Banks (MMTCO<sub>2</sub>E)

	Non Kyoto Gases ODSs	Kyoto Gases HFCs	Total High-GWP GHG
Refrigerant	12 to 27	2.8 to 3.3	15 to 30
Foam	27	0	27
Total	39 to 54	2.8 to 3.3	42 to 58

Data Sources:

- 1) A determination based on three factors: US EPA estimated number of appliances in the U.S., refrigerants and blowing agents used, and the GWP of each refrigerant and blowing agents.
- 2) US EPA national data using the Vintaging Model, which estimates banks and emissions of ozone depleting substances and high-global warming potential greenhouse gases.

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## Potential Control Strategies

- **Program Goal: Recycle 300,000 additional appliances per year through early retirement programs.**
- **Program Options:**
  - Partner with the US EPA, utility companies, and appliance retailers to provide direct assistance through ARB's existing outreach efforts.
  - Evaluate opportunities for recognizing ODSs destruction as part of the broader program that the ARB develops.
  - Develop mechanisms to increase incentives provided to consumers, businesses, and/or appliance recyclers.

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## Current Programs Annual Estimated Benefits & Costs

- **Consumer Benefits & Costs:**

- Financial Benefit - \$24 million
- Capital Cost - \$19 million
- Net Benefit - \$5 million

- **Utility Industry Benefits & Costs**

- Cost Avoidance Benefit - \$12 million
- Operating cost - \$6 million
- Net Benefit - \$6 million

Utility Costs Data Sources:  
US EPA, Appliance Disposal Practices in the United States: EnergyStar rated refrigerator will save a household roughly 700 KWh/year.  
The cost of utility efficiency programs has averaged two to three cents per KWh saved: Krebs, M, Testimony to United States Senate Committee on  
Commerce, Science, and Transportation, June 21, 2007.  
(300,000 appliances \* 700 Kwh/year \* \$0.03 = \$6.3 million)

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## Outstanding Questions

### Questions regarding voluntary appliance recycling option:

- How can new program concepts be designed to ensure a synergistic benefit to add value to current programs?
- Should incentives be increased to expand focus from energy savings benefit to also include a GHG emission reductions benefit?
- Would any economic assistance be available to assist with a voluntary program?

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## Next Steps

- 1<sup>st</sup> Meeting –
  - Obtain program ideas
  - Develop workgroups as needed
- 2<sup>nd</sup> Meeting
  - Collect and share additional data
  - Prioritize program options
  - Outline program options' goals
- 3<sup>rd</sup> Meeting
  - Discuss program recommended goals and characteristics
  - Refine program options
- 4<sup>th</sup> Meeting
  - Review program recommendations

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## Contact Information

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### – **More Information**

- Visit: <http://www.arb.ca.gov/cc/residref/residref.htm>
- Join list serve at:  
<http://www.arb.ca.gov/listserv/listserv.php>

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